125—21

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13,417—1900

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A.D. 1900. July 25. No. 13,417.

THOMPSON'S Complete Specification.

FIG. 7.

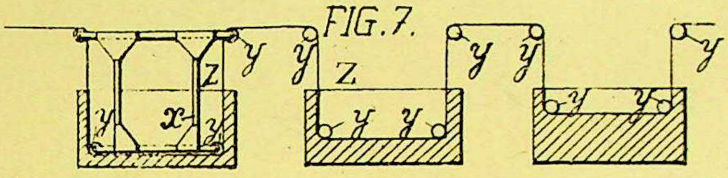


FIG 8

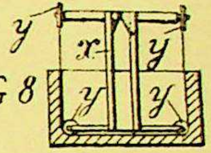


FIG. 9.

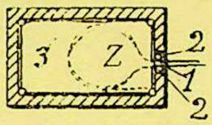
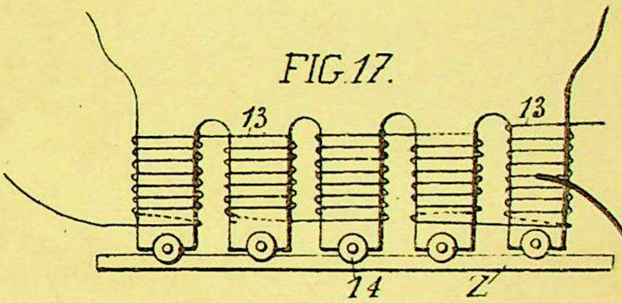


FIG. 17.



Magnets for giving curvilinear direction to wire

FIG. 12.

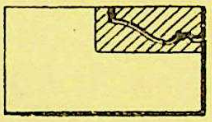


FIG. 12a.

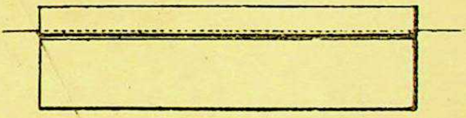


FIG. 13.

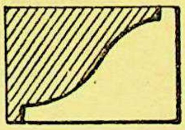


FIG. 10.

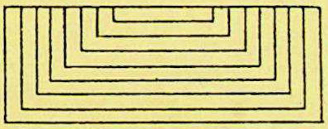


FIG. 10a.

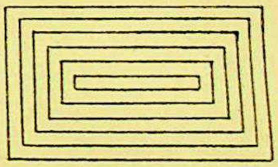


FIG. 11.

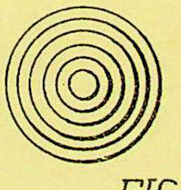


FIG. 11a.

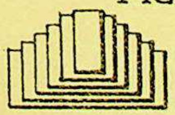


FIG. 14.

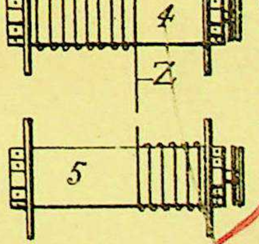


FIG. 16.

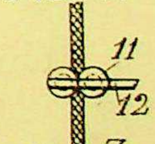


Fig: 16a

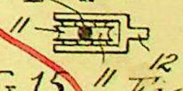
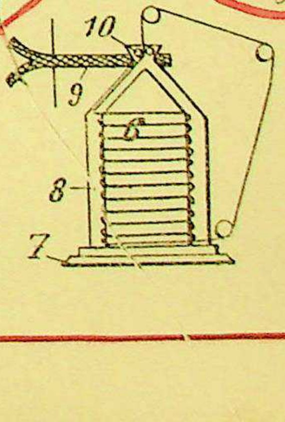


FIG. 15.



Reels for storing wire

Br. Thompson

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(5 SHEETS)
SHEET 4

[illegible]

soft or hard steel parts 22, 23, 24 may be coated with abrasive bonded thereto by fused or electrolytic metal

FIG. 18.

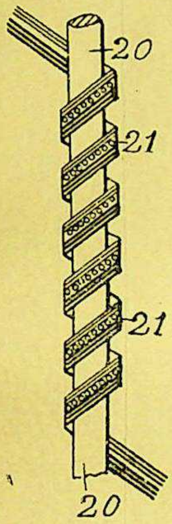


FIG. 19.

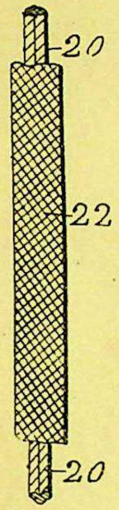


FIG. 20.

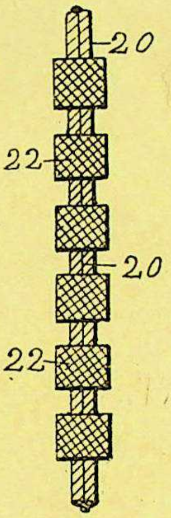


FIG. 21.

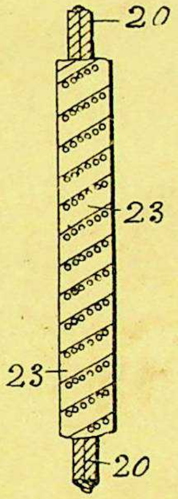


FIG. 22

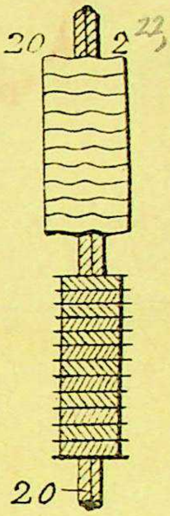


FIG. 19.a

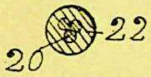


FIG. 20.a

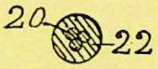


FIG. 21.a

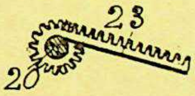


FIG. 22.a

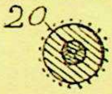


FIG. 23.

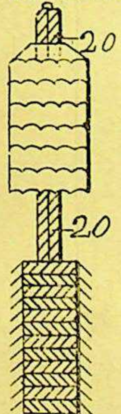


FIG. 24

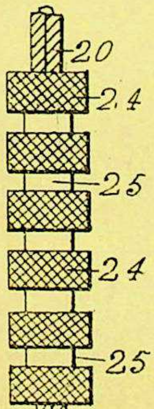


FIG. 26.

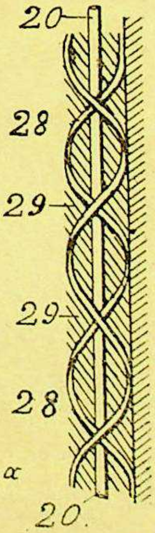


FIG. 25

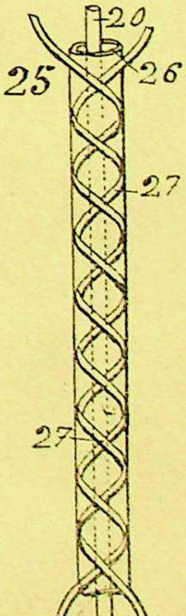


FIG. 23a

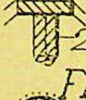
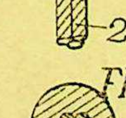


FIG. 24a



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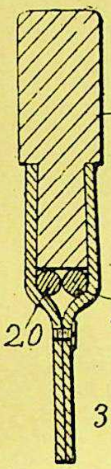


FIG. 28.

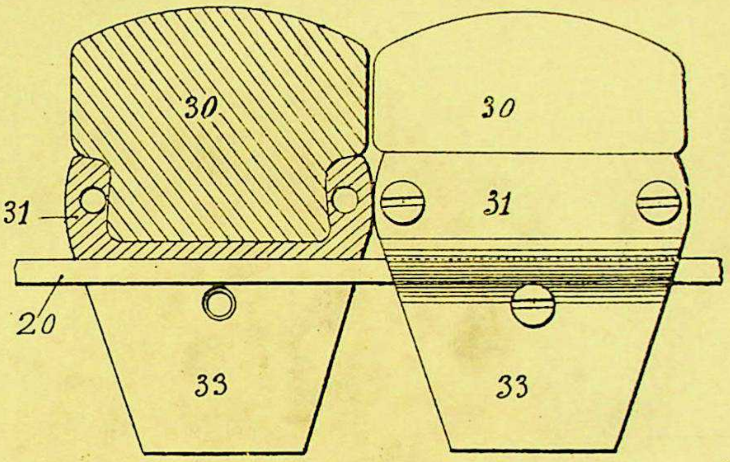


FIG. 27.

FIG. 29.

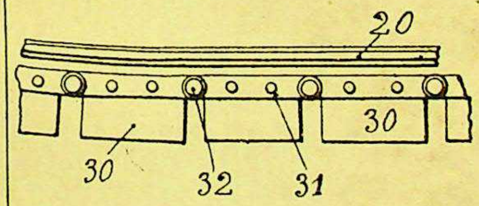


FIG. 30.

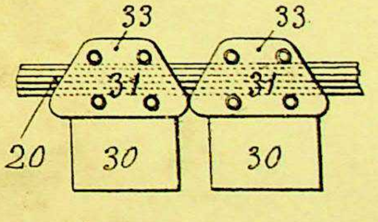
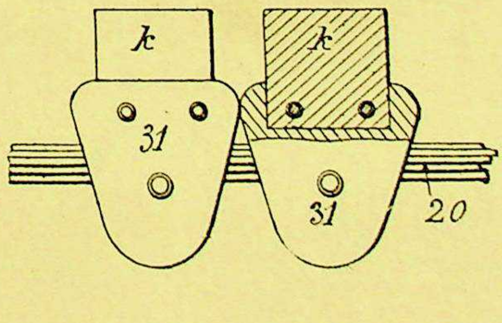


FIG. 31.



[This Drawing is a reproduction of the Original on a reduced scale.]

Malby&Sons, Photo-Litho.

of rotation of the drums to be reversed at the moment desired, and the wire takes an alternating transmission movement.

In the second arrangement (Figure 15) the wire is endless and the movement continuous, and the drum 6 on which it is wound is loosely placed on a central pivot resting on a pedestal 7. This drum can consist of a series of cylindrical rods placed loosely on pivots and arranged in a circle A casing 8 surrounds this circle, and the space between this apparatus is just sufficient to allow the wire to circulate, while preventing the coils from becoming superposed. This cylinder or casing 8 is suspended and mounted loosely on a fixed support 9: it terminates in the form of a funnel, wherein are placed two rollers 10 for guiding the wire. A space is left between the base of this casing and the pedestal 7, for the wire to come out.

Figure 16 with Figure 16ª as a plan view shews an arrangement for the purpose of communicating a movement of rotation on itself to the wire Z which at the same time moves longitudinally For this purpose the wire is held rather tightly at suitable intervals by two friction rollers 11. These rollers are loose on their axis which leaves the wire free to move longitudinally but are mounted on a framework 12 which is caused to rotate, by any suitable mechanical means, round the axis of the wire; the rollers thus partake in this movement of rotation and they consequently cause the wire to turn on itself

The arrangement shewn in Figure 17 is for the purpose of giving a curvilinear direction to the shaping wire. The rollers 14, by their position, determine the course of this curvilinear line as the line Z rests in the grooves of these rollers, but in order to maintain it there, the rollers are mounted at the end of the cores of electromagnets 13 which by their magnetic action draw the wire strongly towards them and keep it thus on the rollers.

For the better comprehension thereof, this figure is straight instead of having a polygonal or curved form. This arrangement also allows of sawing from bottom to top and from top to bottom, following the outline of polygons, circles or other curves.

The special cutting tools for the apparatus just described consists essentially of a core 20 on which is placed a strip or like device for carrying the abrading substance and consisting either of sharp points stuck in the core and radiating outwards or by one of the arrangements which are described below with reference to the accompanying drawings.

Figure 18 shews an arrangement in which a traction wire 20 is surrounded by a strip 21 rolled spirally round it at a fixed pitch. This strip may be of metal or textile material, or leather or the like and be striated or perforated with holes for forming a lodgement for the abrading matter supplied by means of suitably arranged sand boxes. The abrading substance can also be attached to the strip by making the striae in the form of furrows in which the substance is placed and then covered over by turning over the edges of the furrows, or else by pressing the abrading substance into the strip itself.

The strip 21 may also be made by mixing the stuff it is made of with abrading substance obtained by fusion, lixiviation, electrolytic deposition or otherwise.

The wire forming the core 20 can be of any section, cylindrical, square, rectangular *etc*, in the latter cases forming a kind of blade. This core may also be made of one or more wires but should always be sufficiently flexible to adapt itself to the curve of the pulleys which support it in its travelling movement.

Figure 19 shows a modification of this kind of cutting wire Figure 19ª a transverse section of Figure 19, in which the core 20 is covered with a casing 22 formed of a network of metal wires forming lenticular cavities (a kind of metal sheath).

Figure 20 is a modification of the arrangement shewn in Figure 19 and Figure 20ª a transverse section of Figure 20. The metal sheath is interrupted here and there and resembles a string of beads. The advantage of this arrangement is to allow more space for holding the abrading substance.

Figure 21 shows a cutting wire, and Figure 21^a a transverse section of Figure 21, the core 20 of which is covered by a strip 23 spirally rolled with the edges overlapping, and in which lines are sawn both for facilitating the rolling up thereof and to serve as holder for a soft metal which is encrusted with abrading matter, both that which is produced by the action and that carried along by this composite vehicle for the abrading substance.

Figures 22 and 23 with Figures 22^a and 23^a as transverse sections respectively, illustrate a modification of the apparatus in which the core 20 is composed of three twisted steel wires on which are placed thin discs of suitable diameter with interposed connecting links and pierced in the centre with a hole corresponding to the diameter of the three wires. These discs can be cut and shaped in the form of a funnel on a given angle of section and have crenelated edges; they are made of tin plate, hardened or mild steel *etc*, and either combined or not with an abrading substance introduced by fusion, compression, or by electrolytic means *etc.*

Figure 24 with Figure 24^a as a transverse-section shews a cutting wire composed of a core 20 on which are mounted like a string of beads, small cylinders 24 pierced in the centre with a hole corresponding to the section of the core 20. The separation of these cylinders is ensured by circlets or sheaths 25. These cylinders are composed of a mixture of soft metal and abrading substance obtained by fusion, compression electrolytic means *etc.*

Figure 25 shews a cutting wire on the core 20 of which wires or strips 26 covered with emery powder and wires or strips 27 of steel or other metal are wound in the same or opposite directions.

In the modification shewn in Figure 26 the core 20 is surrounded by several steel wires 28 serving to enclose a collection of abrading substance 29, and which are wound on the core 20.

In the arrangements shewn in Figures 27 to 31 the abrading substance is made in the form of blocks 30 encased in supports or sockets 31, and simply tied, rivetted, screwed or soldered or otherwise attached to the core 20.

The core 20 is formed of one or more flexible wires or of a band composed of superposed metal strips having leather rubber *etc*, inserted between them or not, or else by a chain or else again by the supports 31 themselves joined or jointed together like the links 32 of a chain. In order to facilitate their being carried along these supports 31 terminate in a kind of tooth 33.

In order to avoid the shock resulting from putting the teeth too far apart, they can be coupled on the same axis so that the toothing of the left side alternates with that of the right side and *vice versa* In certain unfavourable circumstances, for instance, when the wires, bands or chains operate vertically or at angles nearly vertical the employment of magnetic abrasives and of powerful electromagnets or ordinary magnets, suitably arranged for including the wires *etc.* in a magnetic field will ensure the supply of abrading substance to the apparatus.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, as communicated to me by my foreign correspondent, I declare that what I claim is:—

1. A system of apparatus characterised by the combination of frames, supports, arms, tools and other organs with a flexible cutting-tool for the purpose of enabling the latter to follow all the curves or outlines of the work to be done.

2. An apparatus such as set forth in Claim 1 and especially devised for rock cutting, having arms forming branches of a compass the motion whereof is regulated by a template of the curve to be obtained, substantially as set forth and illustrated in Figures 1 to 6 of the accompanying drawings.

3. The apparatus constructed according to Claim 1, specially arranged for the cutting of hollow or core pieces and composed of a frame, articulated or otherwise, bearing a suitable number of pulleys for the support of the cutting-tool, substantially as set forth and illustrated in Figures 7 to 13 of the drawings.